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FIRST BIENNIAL REPORT

OF THE

Mississippi Geological Survey Commission



NASHVILLE, TENN.:
PRESS OF BRANDON PRINTING COMPANY
1908

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TO VILL
ADDITIONAL

FIRST BIENNIAL REPORT OF THE MISSISSIPPI GEOLOGICAL SURVEY COMMISSION.

To the Legislature of the State of Mississippi:

As you well know, at the last regular session of the State Legislature a bill was passed creating a Geological Survey of Mississippi and appropriating five thousand dollars (\$5,000) a year for its maintenance. During this time investigations have been confined exclusively to subjects of economic importance. We have endeavored to direct the work in such a way as to secure the greatest results for the people of the State.

The members of the Survey are A. F. Crider, Director, assisted by W. N. Logan, of the Agricultural College, and Calvin S. Brown of the State University.

In addition to the regular corps the State Survey, in co-operation with the National Survey, had a party employed from August until November mapping out an area in the vicinity of Clarksdale.

The Survey also secured the services of Mr. J. S. Holmes and an assistant of the Forest Service of the U. S. Department of Agriculture to make a study of the forests of a portion of the State.

PUBLISHED REPORTS.

During 1906 three reports were prepared for publication by the members of the Survey. One was prepared on the Portland cement materials by the Director; one on the lignite or brown coal, by Dr. Calvin S. Brown, and one on the clays of Northern Mississippi, by Dr. W. N. Logan. These reports are now ready for distribution. A short resume of each is given below.

CEMENT MATERIALS.

In the investigations of the Portland cement materials, the Director found that there is in the State a great quantity of limestone and clay, the only two materials necessary in the manufacture of Portland cement. In some places the limestone is more than eight hundred feet thick, a sufficient amount to supply all the cement plants of the country for an indefinite length of time.

LIGNITE.

In his report of the lignite or brown coal deposits of the State, Dr. Calvin S. Brown describes the area underlain by lignite, the

present known outcrops, its thickness, quality and commercial value.

In Texas, in the Dakotas, and in Germany lignite similar to that found in Mississippi is used for heating purposes. The best results are obtained by converting the lignite into producer gas, which process can be done very cheaply, and burning it in a gas engine for producing steam, or in gas heaters for heating purposes. This makes the lignite equal in value to the best coal. Experiments have proved that as much heat can be obtained from lignite by converting it into producer gas and burning it as can be obtained from an equal amount of the best Pennsylvania or West Virginia bituminous coal burned in the common way.

CLAYS.

A valuable report to the clay workers and to the prospective clay workers of the State has been prepared on the brick and tile clays of Northern Mississippi by Dr. W. N. Logan. Samples of clay were collected from various localities, and practical demonstrations made as to the best methods of manipulating each clay to prevent shrinkage and cracking in drying and burning.

The report also contains valuable information on the origin and geological occurrence of clay in Mississippi, with a description of the brick plants of the State.

REPORTS NOW IN PREPARATION.

Four reports are now being prepared by the different members of the Survey. The Director is making a preliminary report on the water power of the streams of the State; Dr. Logan is preparing a report on the brick and tile clays of Southern Mississippi; Dr. Brown is preparing a report on the building, molding and glass sands. The State Survey, in co-operation with the Forest Service of the U. S. Department of Agriculture, is preparing a report on the forest conditions of about nine counties of Southwestern Mississippi. The work is being done under the supervision of Mr. J. S. Holmes, assisted by Mr. J. H. Foster. These reports will not be ready for distribution until the summer of 1908.

In addition to the regular reports the State Survey, in co-operation with the U. S. Geological Survey, is making a detailed topographic map of an area in the vicinity of Clarksdale. Photographic copies of the map are now ready for distribution.

RECOMMENDATIONS.

The work of the Survey for the past two years has clearly demonstrated the wisdom of the Legislature in establishing it. The work should be continued until our own citizens, and those from

other States, seeking new homes, are acquainted with the advantages Mississippi offers to agriculturists, and to those desiring to establish manufacturing plants.

The Survey, the various agricultural organizations, as well as the industrial agents of the various railroads and the commercial clubs of the State, are constantly receiving letters from people of various parts of the country asking for information as to the soils, clay deposits and other natural resources of Mississippi. We should be able to give them the desired information on all of these subjects, otherwise they will probably seek new homes and locations for industries in other States.

WATER POWER.

A preliminary investigation made by the Director shows that a large amount of power can be developed by the streams of the State. This can be done by constructing races, which will avoid the damming of the streams and thus avert the overflow of much valuable land. Many of the most sluggish streams in this way can be harnessed and their water power utilized. Exact levels should be run along the most favorable streams to determine the amount of fall in each. The amount of fall and the volume of water determine the horse power that can be developed in a stream. The work was left incomplete owing to a lack of funds.

CLAYS.

As above mentioned, the Survey, through Dr. Logan, has been making a study of the clays of the State. This work has just begun. Only the more common clays have as yet been studied. The high grade pottery clays, stoneware clays, face brick, paving brick, sewer pipe and fire clays have received but little attention. It is the purpose of the Survey to exploit these valuable clays and bring them to the attention of the public.

NATURAL PAINT.

In the course of the regular work of the Survey a few samples of lignite, lignitic clays and ocherous clays have been collected and tests made of them for paint by Dr. Muckenfuss of the State University. The paint made from some of the samples compares favorably with that made by the Natural Carbon Paint Company of Freeport, Illinois, and shows the possibility of a systematic investigation of the clays and ocherous clays of the State with a view of making paint.

ROAD-MAKING MATERIALS.

If the State is ever to have good roads they must be made of the materials found within its own borders. It is unnecessary to

argue the need of better roads, especially in regions where there is a clay soil or subsoil foundation. Such roads become impassable in rainy seasons. The very material which makes bad roads is the best soil for agricultural purposes, and, if properly used, can be made into good, substantial roads.

SOURCE OF ROAD-MAKING MATERIAL.

The materials found in the State suitable for making good roads are stone, gravel, burned clay and a combination of clay and sand.

STONE.

Good stone for road-building is found in Tishomingo County, in Smith and Jasper Counties, in the Tallahatta buhrstone formation, which outcrops in more or less isolated localities in Grenada, Montgomery, Attalla, Leake, Neshoba, Newton, Lauderdale and Clarke Counties.

GRAVEL.

Tishomingo County alone can supply enough gravel to ballast half of the roads of the State. Gravel is also found along the line of the bluffs from Memphis to Natchez. It is not found in large quantities in the central part of the State.

BURNED CLAY FOR ROAD-BALLAST.

It has been shown that certain tough clays, when properly burned to a clinker, make a durable and one of the cheapest road ballasts where wood can be obtained at a reasonable cost for burning the clay. Such clays are found in portions of the Yazoo delta, in the eastern prairie region and in certain localities of central and southern Mississippi.

SAND CLAY ROADS.

A definite mechanical mixture of clay and sand has been found to give excellent results for making roads where other harder materials are not available. These materials can be found in abundance in all parts of the State.

A thorough study of the road-making materials should be made with a map accompanying the report showing the localities where each material can be successfully used.

DRAINAGE.

The State Survey, in co-operation with the U. S. Geological Survey, has made a very detailed map of about 360 square miles

in the vicinity of Clarksdale. This map was made for the purpose of determining the possibility and advisability of artificial drainage in the Yazoo delta. It is the first map of the kind that has ever been made of the lowlands of the lower Mississippi. It shows a sufficient fall to carry off the water, and the ease with which the delta country can be drained, thereby reclaiming thousands of acres of the most valuable land of the State and of the South. This work should continue until all of the lowlands of the State are mapped. We can continue to secure the co-operation of the U. S. Geological Survey, which will expend an equal amount to that made by the State Survey and thus greatly hasten the completion of the work.

A report should also be made on the advantages of artificial drainage which has been attempted in the State. It has proved a success on a few farms where it has been tried in Buttahatchie bottom, in Oktibbeha and Clay Counties, in the Yazoo delta and in other parts of the State.

SOIL SURVEY OF THE STATE.

But few people of the State, and still fewer of other States, know that in the coast counties of Mississippi are soils which will produce an excellent variety of oranges, Mandarins, pecans; English walnuts, celery and other profitable crops. Improved celery land in Florida is selling for as much as one thousand dollars an acre, and it has to be irrigated, whereas in this State there is sufficient rainfall to produce the crop. The average price of celery grown to the acre in Florida is thirteen hundred dollars. Our lands will do as well. The only difference between the Florida land and the Mississippi land is that the Florida land has been advertised and the Mississippi land has not. Mature pecan trees on the coast are now producing as much as five bushels of the finest paper-shell pecans, which retail for as much as forty cents per pound. As many as sixteen to twenty trees can be planted to the acre.

Mississippi has always been considered an agricultural State and cotton the cash crop. Reports show that the Boll Weevil has already crossed the Mississippi River and is found in the southwestern part of this State. The Government and the State Experiment Stations so far have been unable to exterminate or materially check this destructive pest. The only way to entirely eradicate it is to quit raising cotton for a few years. But this is impracticable at the present time because cotton is about the only cash crop the farmers have. Something should be done now to avert the trouble in which the farmers will soon find themselves if they continue to raise cotton. This can best be done by substituting some crop or crops which will take its place.

The South is the home of early vegetables and fruits. They can be shipped North before the northern crops can possibly be put on the market. But instead of taking advantage of this fact we are buying a part of our vegetables and most of our fruits from other States.

In the vicinity of Crystal Springs, Madison Station, Durant, Kosciusko, Pontotoc and other localities of the State, vegetables and fruits are being profitably grown. These crops are more profitable than cotton and they bring into the State a substantial and desirable class of people. The industry should be studied in the various localities and the soil analyzed to determine the qualities which make it suitable for truck farming. A colored map should be made correlating the soils of similar nature and showing their adaptability to certain crops.

ALFALFA.

Alfalfa is one of the most profitable crops the farmer can raise, but it cannot be grown in every part of the State. Numerous failures have been made trying to raise it on land which is not adapted to its nature. It will not grow on soils showing an acid reaction. A careful study of the soils would determine the favorable and unfavorable localities for its propagation.

A detailed soil map would also form the basis and pave the way for more efficient work of the State Agricultural Department.

Therefore, in consideration of the above, we believe that there is no department of the State that is of more practical benefit and means more to its material development than the Geological Survey, and we urgently request that the Legislature increase the appropriation to the sum of ten thousand dollars (\$10,000) a year, that the work may be continued as planned by the Director.

JAS. K. VARDAMAN,
DUNBAR ROWLAND,
J. N. POWERS,
A. A. KINCANNON,
J. C. HARDY,

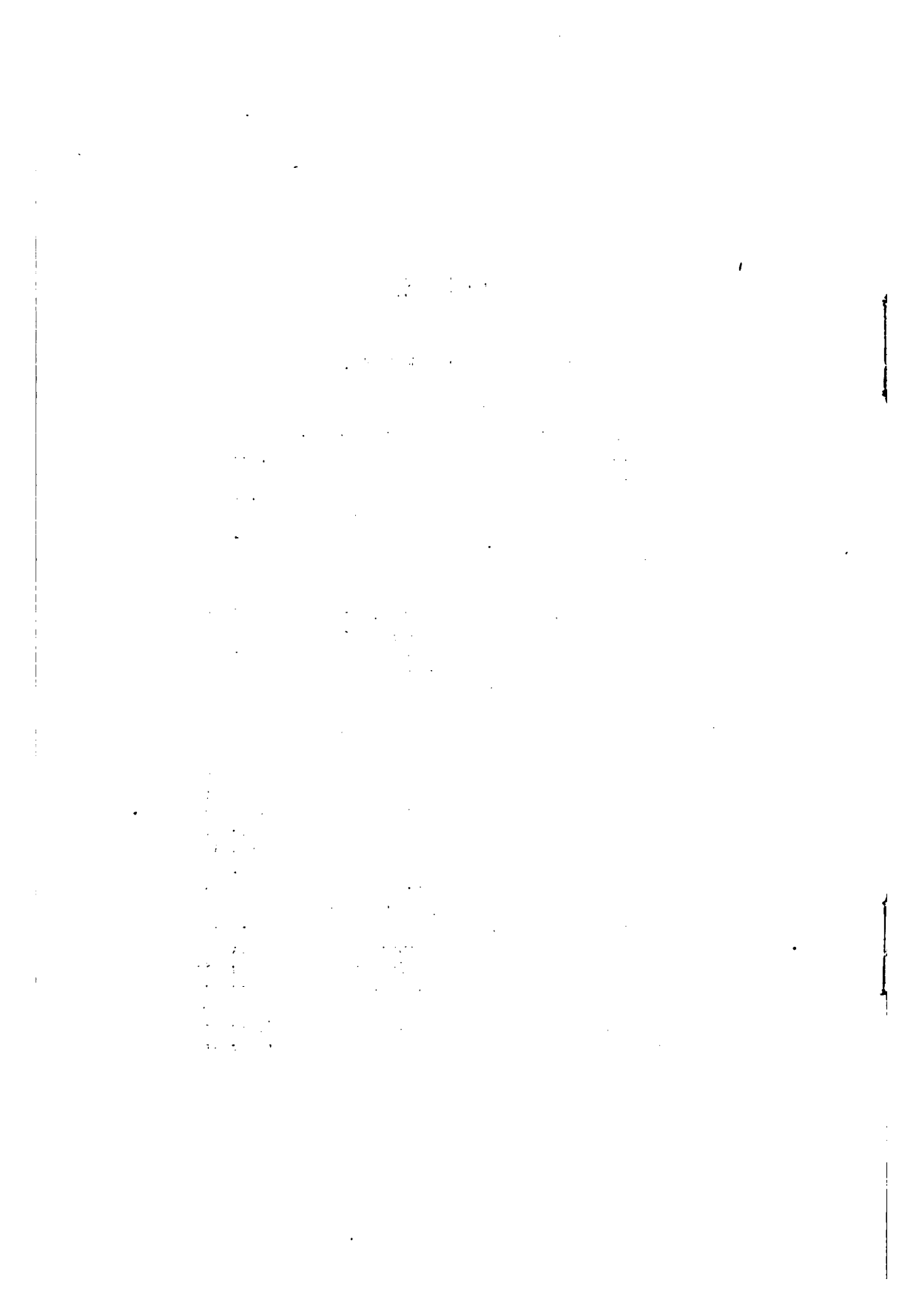
Commissioners.

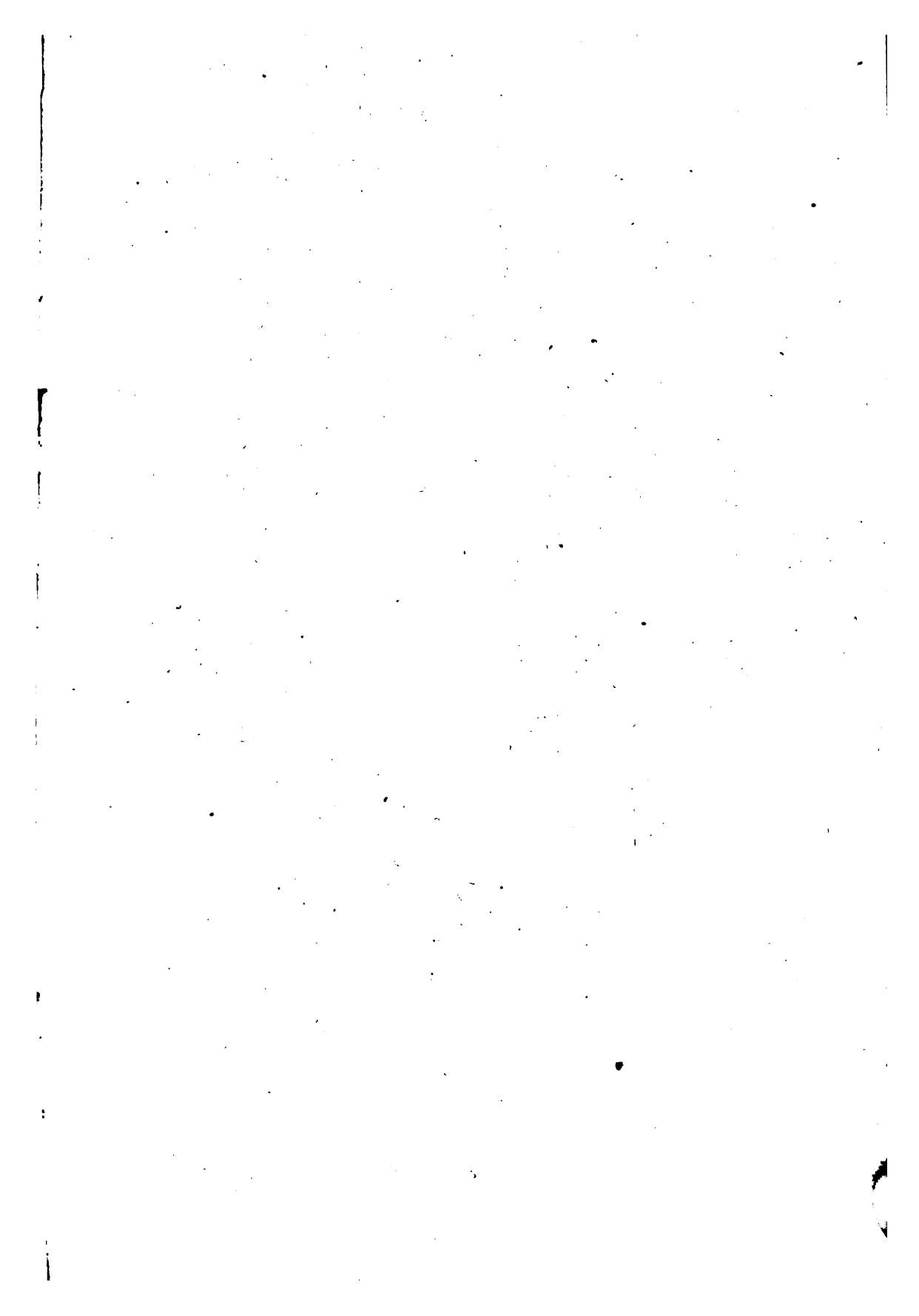
Office of the Mississippi Geological Survey Commission, Jackson,
Miss., December 10, 1907.

APPENDIX.

FINANCIAL STATEMENT.

A. F. Crider, State Geologist, salary from May 1 to December 31, 1906.....	\$1,333 20
A. F. Crider, State Geologist, expenses from May 1 to December 31, 1906.....	401 31
C. S. Brown, Assistant Geologist, salary for 1906.....	397 90
C. S. Brown, Assistant Geologist, expenses for 1906....	322 55
W. N. Logan, Assistant Geologist, salary for 1906.....	437 50
W. N. Logan, Assistant Geologist, expenses for 1906....	217 05
W. F. Hand, State Chemist, chemical analyses for 1906..	250 00
R. B. Fulton, expenses as Commissioner for 1906.....	38 00
Jas. K. Vardaman, expenses as Commissioner for 1906..	5 00
J. C. Hardy, expenses as Commissioner for 1906.....	57 30
Dunbar Rowland, expenses as Commissioner for 1906..	12 00
H. L. Whitfield, expenses as Commissioner for 1906....	15 00
Eyrich & Company, for ledger.....	5 00
Mrs. E. O. Gregory, for copying minutes of meetings, 1906.....	5 00
Alfred Hume, expenses as Commissioner for 1906.....	13 15
Co-operative work with the U. S. Geological Survey...	1,490 04
A. F. Crider, State Geologist, salary for 1907.....	2,000 00
A. F. Crider, State Geologist, expenses for 1907.....	448 19
C. S. Brown, Assistant Geologist, salary for 1907.....	182 65
C. S. Brown, Assistant Geologist, expenses for 1907....	221 43
W. N. Logan, Assistant Geologist, salary for 1907.....	250 00
W. N. Logan, Assistant Geologist, expenses for 1907....	170 76
A. A. Kincannon, expenses as Commissioner, 1907.....	16 90
J. C. Hardy, expenses as Commissioner for 1907.....	25 70
Co-operative work with U. S. Geological Survey.....	102 06
Co-operative work with the U. S. Forest Service.....	500 00
Total expended to January 1, 1908.....	\$8,917 69
Balance in the treasury.....	\$1,082 31





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